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Swamps and Marshes

Questions to consider

- ① What is a wetland? What three factors must be present for a place to be considered a wetland?
- ② What are the main types of wetlands found in Missouri? What are the differences and similarities between them?
- ③ What is different about wetland soil? How does it get that way? How can we recognize it?
- ④ What are some examples of the special adaptations found in wetland plants?
- ⑤ How are wetlands important to Missouri's fish, birds, and other wildlife?
- ⑥ How do wetlands improve water quality?
- ⑦ How do wetlands provide natural flood control?

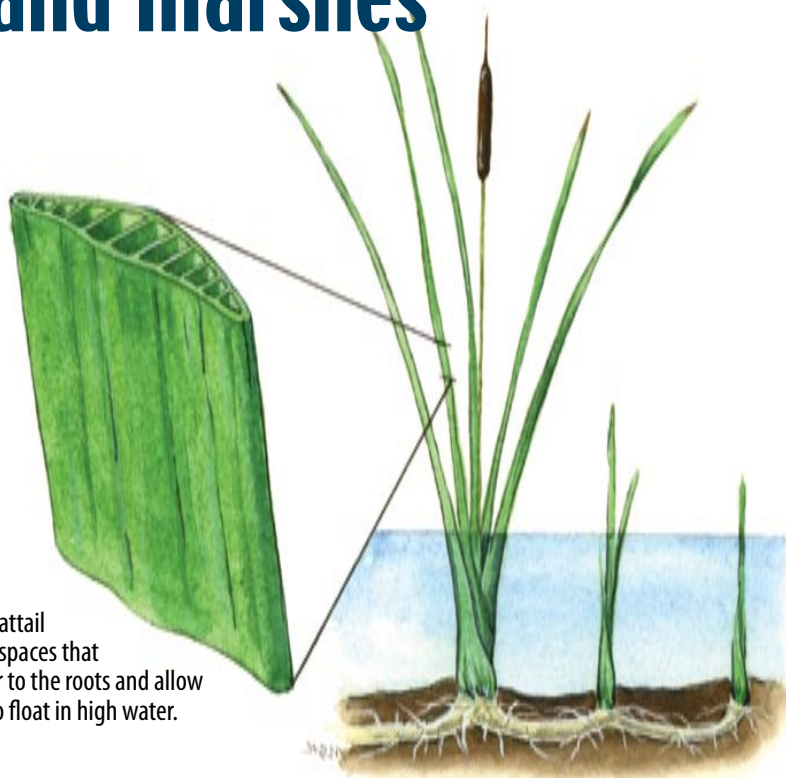


FIG. 9.1—Cattail leaves have spaces that transport air to the roots and allow the leaves to float in high water.

Wetlands are wet land

Wetlands are places where the land and water meet. In a wetland, the soil is saturated or covered with water at least part of the year. Staying wet gives the soil unique properties. In those places, the wet land becomes a home to a wide range of plants and animals that live in the soil and on its surface. Wetland plants are specially adapted to live in saturated soil. Missouri has two main types of wetlands: marshes, where reeds and other grasslike plants grow, and swamps, in which woody species (trees and shrubs) thrive. But the key ingredient in a wetland is water.

All wetlands are wet for a major part of the growing season (spring and summer). Some wetlands may have standing water. Others may only appear slightly muddy, or may even seem dry at the ground's surface. But dig a hole and it will fill with water very quickly. The soil holds water like a sponge.

When soil is saturated the space between the bits of dirt is filled with water. This leaves little or no room for air, giving the soil a grayish color and a gooey texture. In the water, tiny creatures break down dead plant and animal matter called **detritus**. Because the detritus layer settles beneath the water and is not exposed to air, special kinds of decomposers are needed. **Anaerobic** bacteria, which do not need oxygen to live, are the stars of the wetland ecosystem. As they break down the detritus, they produce sulfur-containing compounds. The sulfur compounds smell like rotten eggs. But the smell tells us the wetland is healthy. The rich detritus nourishes a complex food web.

How to breathe under water

Wetland plants are adapted to take advantage of every ray of sunlight. They have special ways to expose their leaves to the sun and avoid being shaded by other leaves. They also have roots that can pull in water and still

get air, too. Plants that grow in shallow water have roots that grow in the mud and hold onto silt. Most of these plants are tall because they have greater support, enabling them to rise above other plants to reach the sun. Cattails, buttonbush, rushes, sedges and arrowheads do this very well. Other plants such as water lilies grow in deeper water but are still anchored. Plants such as duckweed grow in open water to avoid the shade of taller plants, but they float by using air spaces in their leaves. (FIG. 9.1) Their short roots hang free in the nutrient-rich water. Another challenge of wetland plants is how to get enough air for their cells. Only specially adapted plants that like to have their roots wet can grow in saturated soils. Since there is not much air in the soil, only specially adapted plants can live in a wetland. The cypress tree's roots (called knees) extend up and out of the water. Sedges and rushes have air spaces inside their leaves to take oxygen and carbon dioxide to the roots. Nearly half of Missouri's plant species grow in wetlands.

Like wetland plants, animals that live in wetlands are special too. Wetlands are home to many invertebrates, amphibians, reptiles, fish, birds and mammals. In fact, you can find more animals and plants in an acre of wetland than in any other kind of ecosystem. (FIG. 9.2) They are adapted to find and catch food in wet places. The whirligig beetle's eyes focus both above and below water level to help it find prey at the water's surface. The heron's feet help it to walk on mud. Herons can snatch fish from under water with their long, slender necks and scissorlike beaks. Wetlands are the main habitat for furbearing animals, like beaver, otter and muskrat. The dense, oily fur, sharp teeth and webbed feet of beavers and muskrats help them stay dry, cut through tough stems and swim quickly. The frog's long legs and the turtle's shell help them escape predators. Ducks have spoonlike, flattened bills that make it easy for them to strain plants from shallow water. Such diverse and specialized plants and animals make wetlands interesting places to study. (FIG. 9.3)



FIG. 9.2—Wetland ecosystems are the most productive in the world.



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FIG. 9.3—Specialized plants and animals make wetlands interesting places to study.

With their upturned eyes and mouths, mosquitofish can slurp down mosquito larvae. Some fish, such as northern pike, walleye and yellow perch, need shallow, marshy places for spawning. In fact all freshwater fish are partially dependent on wetlands. Young fish can find protection from larger fish and other predators by staying in the plant-filled shallow water of wetlands. Nutrients are available in the detritus in forms that small fish can use.

Gas, food, lodging

More than a quarter of our nesting and migratory birds depend on wetlands for part of their life cycle. Missouri's wetlands serve the vital function of providing migrating waterfowl a place to rest and replenish energy reserves lost in flight. Predatory birds such as

osprey, bald eagles, kites, hawks, and owls also feed and nest in wetlands.

Ducks, geese, swans and shorebirds rely on wetland habitats. In fact, many of Missouri's wetlands are managed specifically with ducks in mind. Protecting and restoring wetlands in Missouri will allow more migrating ducks, like these mallards, to spend time in the state. (FIG. 9.4) Ducks Unlimited and other citizen conservation groups, together with state and federal agencies, have helped restore millions of acres of wetland.

Wetlands improve water quality

Until the 1990s, people rarely thought that wetlands were good for anything more than wildlife habitat. Today, however, we know that wetlands have many other helpful functions. Wetlands filter out pollutants. They recharge aquifers. They reduce flood damage, control the quantity and quality of water flow and even produce useful money-making crops. Wetlands are also fun for people. Millions of birdwatchers, hunters, fishermen and outdoor lovers of all types enjoy wetland beauty.

Wetland plants absorb pollutants, store them, break them down and in some cases even use them as nutrients. For example, excess plant nutrients from fertilizers reduce water quality in many streams and lakes. But because wetland plants can store these nutrients, they use them as fuel for growth. Bacteria found in wetlands can even break these chemicals down into harmless gases and release them into the atmosphere. Livestock feedlots and some cities are using wetlands' amazing ability to improve water quality to treat their wastewater.

Wetland ecologists help protect wetland ecosystems

Most wetland ecologists focus on recreating wetlands and taking care of the those that are left. They work for agencies such as the U.S. Environmental Protection Agency, Missouri Department of Conservation, Army Corps of Engineers and U.S. Fish and Wildlife Service. Others work for private companies or groups such as Ducks Unlimited. Finding wetland borders and enforcing laws that protect wetland ecosystems requires field work. Wetland ecologists have to check water quality, identify water-loving plants and understand the water, geology and soil of the area. These jobs require at least a bachelor's degree in biology, environmental science or a related field.



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FIG. 9.4—Missouri wetlands allow ducks to restore fat reserves.

Wetlands also improve water quality by cleansing runoff that comes from higher in the watershed. Because of their flatness and lush plant growth, wetlands slow the flow of water coming into them. In the slow water, suspended soil particles settle out. The water then trickles into nearby streams and seeps into groundwater. Wetland plants also filter particles from water, keeping sediment out of streams and rivers.

Soaking it up

Another function of wetlands is their role in flood control. Wetlands act as giant sponges. Their organic

matter and specialized plants take in up to 18 times their weight in water. During periods of heavy rains or runoff, wetlands first hold water then release it slowly back into the watershed. By holding water and letting it go slowly, wetlands reduce the total amount of water going into lower watersheds. This reduces flood risk and peak flood volume downstream. Because wetlands hold soils and slow water flows, they are great at stopping erosion. Unfortunately, humans have disrupted this natural flood control mechanism by building levees along rivers, digging drainage ditches through wetlands, and channelizing streams. The ironic and unfortunate consequence of these actions is

to increase damage from floods. We might like to think it's a natural disaster, but really it is a problem people have created through their own actions.

We have just begun to know and value the special role of wetland ecosystems in controlling pollution, improving water quality, reducing flooding and erosion and refilling groundwater supplies. Because of the great number and variety of life forms they support, wetlands provide many hours of outdoor fun, plus educational and scientific research opportunities. One of the best ways to protect the wetlands we have left is to understand how their many benefits serve us all.

The future of wetlands

In 1972, Congress passed the Clean Water Act, which gave strong protection to wetlands. After the floods of 1993 and 1995, areas such as Columbia Bottom near St. Louis and Big Muddy near Boonville were turned back into wetlands to provide flood control and wildlife habitat. Cities such as Columbia even use wetlands to treat wastewater. Farmers across the state use wetlands to filter polluted water from feedlots. These examples

show that people are learning to value and use the many good things that wetlands do. But we have a long way to go toward bringing back these special places to Missouri. The future of Missouri's wetlands depends on citizens who value and enjoy them.



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